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ABSTRACT

The assessment programs of Alberta Education (Canada) are described, and the principles that guide these programs are reviewed. Alberta is committed to authentic assessment in its three major assessment programs: (1) the Diploma Examinations Program for certification in specific courses at the end of high school; (2) the Achievement Testing Program for monitoring student achievement in grades 3, 6, and 9; and (3) the diagnostic evaluation programs. Three key principles in assessment in Alberta include: assessment is based on clear expectations for student performance; assessment recognizes the central role of language in learning; and assessment provides models for good teaching. To extend the range of student performance being assessed by the Achievement Testing Program, several types of performance-based assessment are being piloted in addition to written-response activities. A pilot project on the use of portfolios to systematically gather information on student achievement conducted in four classrooms (120 students) illustrates the continuing efforts of Alberta Education to provide authentic assessment of student achievement. Fourteen appendices contain individual descriptions of components of the testing programs, with some samples and scoring instructions. (SLD)

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ASSESSMENT IN ALBERTA:

DIMENSIONS OF AUTHENTICITY

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A presentation in the NATD/NCME symposium:

MORE AUTHENTIC ASSESSMENT: Theory and Practice

Chicago, Ill.

April 4, 1991

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Chicago, April 1991

NATD/NCME Invited Symposium:

MORE AUTHENTIC ASSESSMENT: Theory and Practice

INTRODUCTION: GOOD ASSESSMENT SUPPORTS TEACHING AND LEARNING

The title of this symposium urges us to examine what is authentic about our assessment programs and how they can be made more authentic. For my purposes, authentic assessment is defined as assessment that, to the extent possible, provides students with an opportunity to show what they *really* know and can do.

In Alberta, we have been concerned about authentic assessment since 1980 when our provincial Student Evaluation Program was first announced in our legislature. We have been absolutely committed to being fair to students, but in all our assessment programs we also wanted to know *what* exactly students have learned and *how well*, in relation to expectations. That is why there is a close tie between our assessment programs and the province's intended curriculum.

The recent emergence of the term *authentic* in assessment literature has been very useful in our work because it has helped us enrich our concept of validity, placing particular emphasis on situational variables. The concept of authenticity has caused us to examine once again how our assessment programs actually reflect learning in a real world environment, and how our programs contribute to good teaching and learning.

We have three major assessment programs in Alberta, with three different purposes. While we want assessment in each of the programs to be as authentic as possible, each is constrained to a degree by its purpose. At this time, the Diploma Examinations Program is the most constrained in its authenticity because its purpose is to certify individual students' achievement in specific courses at the end of high school. Since 50 percent of a student's final mark in a diploma examination course comes from the provincial

examination, the questions must be tied to course objectives which are not in themselves necessarily related to real world experiences. Further, test reliability is critical to ensure fairness and equitable treatment of students. Therefore, we exercise considerable control over the design, development, administration, and marking of these examinations.

The second program, the Achievement Testing Program, is intended to monitor student learning at grade three, six, and nine throughout the province. The tests are based on the intended curriculum generally, but the lived curriculum is important too in their design. Also, the focus is on group data. Thus the constraints are lesser; we are more free to construct the tests to fit the children's real world experiences in the core areas of language arts, mathematics, science, and social studies. Fidelity between the intended curriculum and our assessment remains an essential feature, nonetheless. We want to describe as fully as possible what students know and can do, not merely to report a single mean score.

Third are the diagnostic evaluation programs. Here we are the most free. The entire focus of the programs is on the students' day to day experiences and learning. The purpose is entirely to support teachers in their efforts to plan instruction according to the needs of individual students. Even in these programs, however, authenticity is constrained to some degree since we are concerned about the reliability of the criteria we develop for observing and analysing student performance.

We are aware, too, that teachers and students are not the only ones to be served by our assessment programs. Parents and the public, as well as school administrators, have the right to know how well students are learning what they are expected to learn. Policy-makers need reliable information about the impact of their decisions on the over-all system. We aggregate students' results on our diploma examinations and achievement tests and provide school, district and provincial level reports. This information is given to the superintendents for use within their districts. Thus while we are ensuring that the authenticity of our assessments enriches our information base, we take care to protect our publics' confidence in the information.

Concerns about "soft data" need to be addressed, therefore, possibly through stringent controls on administration of authentic assessments. This paper, however, offers more on the content of authentic assessment than on the administrative processes that may be necessary to reassure skeptics.

I would like to discuss the ways in which our assessment programs encourage sound teaching and learning processes. Three key principles guide our work:

1. Assessment is based on clear expectations for student performance.

2. Assessment recognizes the central role of language in learning.

3. Assessment provides models for good teaching.

CLEAR EXPECTATIONS FOR STUDENT PERFORMANCE

In Alberta, provincial learning expectations form the basis for both instruction and evaluation. What we expect of students determines what we do at various points in their education both to focus their learning and to assess how close they are to our expectations. In so far as expectations are concerned, "we" includes not just educators, but also parents, policy-makers and other members of the public.

Our expectations are made explicit in the *Alberta Program of Studies*, a legal document which sets out what students must learn in each subject of study and at each level of learning. It provides teachers and school administrators throughout the province with the same starting point for the intended curriculum.

The learner expectations outlined in the *Program of Studies* are the basis on which we prepare both our test blueprints and our performance standards for diploma examinations and achievement tests. The blueprint for an examination or test ensures that the assessment design has fidelity with *what* students are expected to have learned, and the performance standards ensure that the assessment is consistent with *how well* students are expected to have learned it. In Alberta, both blueprints and performance standards are tied to the intended curriculum. (See *Appendix A* for a sample of performance standards and *Appendix B* for a sample blueprint.)

Our performance standards are widely shared among teachers well in advance of assessment, as are sample questions and criteria for scoring of answers. We encourage teachers to share these with students. The descriptive statements of desired performance indicate what underlies our acceptable standard and our standard of excellence. Teachers gain further clarification of the performance standards through involvement in centralized test development and marking activities. For example, teachers from all parts of the province meet in a central location to establish criteria for writing. They apply these criteria to students' papers under provincial direction.

The extensive involvement of teachers in our assessment programs helps us to make the necessary connection between instruction and assessment. Through their interaction with each other beyond their individual classrooms, teachers have an opportunity to develop a shared notion of learner expectations and standards. This may be why teachers overall support our Diploma Examinations Program and consider the examinations valuable. This was reflected in a recent Alberta Teachers' Association survey on the impact of diploma examinations on the teaching-learning process (de Luna, 1991). Responses to the teacher questionnaire indicated that teachers see the examinations as a help in their teaching and as a means of self-evaluation.

Our assessment programs are more authentic because we link provincial learner expectations and performance standards to the design and marking of our diploma examinations and achievement tests. When we report aggregate results, we report in relation to the acceptable standard and the standard of excellence. Our *Examiners' Reports* (See *Appendix C.*) are written to reinforce the connection between expectations and results. We want teachers in particular to see consistency in provincial statements about what students should learn and how well.

All aspects of our Student Evaluation Program are open to public scrutiny. Our diploma examinations and achievement tests are released after administration, for example. In this way, we are held accountable for the alignment between curricula and evaluation and for the quality of our instruments and assessment processes.

THE ROLE OF LANGUAGE IN LEARNING AND ASSESSMENT

While most assessment focuses on outcomes (i.e. what and how well students have learned) authentic assessment also reflects *how* students have learned. This dimension adds to the validity of assessment information; ultimately it enhances learning by supporting and demonstrating for teachers aspects of sound teaching practices.

In Alberta, we have focused on language as central to learning. The importance of language in learning is not new to educators. Phrases such as "writing in the content areas", "writing across the curriculum", "language for learning" are commonplace and reflect this awareness of the critical role of language.

Our understandings in this area have been greatly influenced by Vygotsky (1962), who theorized that speech becomes internalized and ultimately merges with thought. Vygotsky emphasized the contrast between what a child does independently and with assistance. His notion of the "zone of proximal development" revealed the importance of interaction - and thus language - in a child's learning.

Since the 1960s, the link between language and learning has been examined extensively and has begun to have a noticeable influence on curricula and teaching. Britton has no doubt been a major facilitator in these developments. Building on the ideas of Vygotsky, as well as others, Britton (1970) theorized about the critical role in learning of personal expressive language - language of conversations, meant for expressing thoughts and feelings with no particular instrumental goal. Britton identified the pervasive contribution of this informal language in the development of deeper and deeper understandings and the development of language itself.

Britton and many others who followed have helped educators move from merely an awareness that language is important in learning (a somewhat intuitive position) to a much more clearly articulated sense of its role. Class discussion, student projects, learning logs and self-evaluation are no longer new. Their use is encouraged in Alberta not only by the educational literature but also by the teacher resource manuals which are developed by

the provincial government and made available to teachers for a nominal fee. The prevalence of these new approaches in classrooms reflects the greater consciousness that exists in the education community about the need for students to work from their own experiences - to use language to organize their experiences and give them meaning; "we ... go back over events and interpret them, make sense of them in a way that we were unable to while they were taking place" (Britton, 1970, p.19).

This consciousness and these new instructional approaches go hand in hand with developments in student assessment. In Alberta, we are emphasizing writing in our tests and examinations. All our school-leaving diploma examinations and many of our grades 3, 6 and 9 achievement tests include extended written-response questions. The 1990-91 examinations, for example, contain the following percent emphasis on written-response:

Mathematics and Chemistry	*- 20 percent*
Biology, Physics, and Social Studies	*- 30 percent*
English	*- 50 percent*

The English examination most closely reflects the features of real writing situations. (See *Appendix D.*) A passage from prose or poetry serves as a prompt for two pieces of writing - a personal response followed by an essay of literary analysis. The personal writing allows for exploration and inner dialogue and facilitates the analysis required for the essay. Thus, even in the exam setting, the students can use many of the writing processes they ordinarily use when writing independently.

The inclusion of written-response in mathematics and the sciences is especially important because of increasing emphasis on thinking processes in our curriculum, as elsewhere. (See *Appendix E.*) We are moving as fast as we can to asking questions that have no single right answer - questions that encourage students to begin their responses with "... Well, that depends ..."

Besides written response, other types of student-constructed answers are required by some of our test questions. (See *Appendix F.*) For example, a math question for elementary students, related to making change, provides a picture of a variety of coins, requiring students to indicate a selection of coins they would expect to receive as change, given the details of purchase stated in the question. In another question, students can record data by shading in a bar to complete a graph. In the high school mathematics and chemistry examinations, students are required to write in their numerical responses to problems rather than just select the correct answer from four alternatives. (See *Appendix G.*) The technology allowing responses such as these to be machine-scanned has had a somewhat revolutionary influence on the design of our paper/pencil tests; it has increased considerably the extent to which questions can represent classroom instruction and real-life situations.

ASSESSMENT PROVIDES MODELS FOR GOOD TEACHING

Among the principles informing our development of assessment tasks is the idea that assessment should focus teaching on what is important in learning. In language arts, for example, reading passages are selected from published works to reflect curriculum objectives. To the extent possible, complete literary selections are used and the questions focus on the author's message. Also considered are factors such as the likely interest of a passage to the students, the richness of the language the author uses, the portrayal of gender roles and other features which make the passage a valuable piece of reading.

Multiple-choice questions in our tests are designed to assess students' ability to think through a problem or situation too. Most of the multiple-choice questions require students to go well beyond simple recall. We know from research on reading processes that multiple-choice questions are "authentic" reading activities (Farr, Pritchard, & Smitten, 1990). These questions require students to use language to analyse information and to pull together the parts based on what they already know. They must use their knowledge and experience in making judgments, just as they do in real problems both inside classrooms and outside.

In social studies, for example, questions are presented in relation to source data. (See *Appendix H.*) The source data is collected from newspapers, magazines, or historical documents on social issues or key social studies concepts. The "family" of inquiry questions lead the student through an analysis of the source data and the application of learnings from the classroom. Whenever appropriate, we construct questions in family groups, so as to assess a particular set of skills within a certain context. Similarly in teaching, grouping of learnings around a specific theme or topic is a common practice.

In mathematics, we are field testing the use of a small kit of materials that could be attached to each grade 3 achievement test. The kit includes items such as paper clips, string, ruler, and counters that the student would use in solving a problem or a set of problems. This adds an element of authenticity to the test and encourages the use of manipulatives in mathematics teaching.

At present, we permit students unrestricted use of calculators in most parts of the grade 6 mathematics test (excluding the section on basic facts), and in all parts of the 9 and 12 examinations. Data sheets and formulas are provided for students as well.

To assist teachers in clarifying for students course expectations and performance standards, we publish sample questions and scoring criteria, as well as annotated samples of student work from previous examinations. In social studies, for example, we encourage teachers to share with students how they will be marked on their examination essays and the specific criteria for scoring. (See *Appendix I.*) These materials as well as the tests serve as a resource in support of good teaching.

In addition, we have developed assessment materials specifically designed to encourage diagnostic teaching. The purpose of these materials is different than that of tests and exams. They are intended primarily to allow a teacher to gain information about an individual student's learning. Here the "how" of learning is particularly in focus. Of special interest are our diagnostic programs and our piloting of performance-based assessment activities.

Diagnostic Programs

Two of our diagnostic programs are for teachers of elementary school students, one for reading and one for mathematics (Alberta Education, 1986; 1991). Both programs reflect the concepts and learning objectives presented in the *Program of Studies* for these areas. They provide strategies for identifying individual students' strengths and weaknesses in the cognitive processes central to reading and mathematics. Diagnostic criteria are valid for Alberta students and are reliable. Finally, the programs provide instructional strategies that help students build on their strengths while addressing learning processes needing attention.

The Diagnostic Reading Program provides teachers with strategies and materials to find out how well the student is using cognitive processes to construct meaning from a passage when he/she reads. The processes that are assessed are as follows: attending, associating, analyzing, predicting, inferring, synthesizing and monitoring. Alternative instructional strategies, "whole language" in nature, are provided to address areas of strength and weakness in students' reading.

Extensive inservice was provided on the use of the Diagnostic Reading Program, upon its completion in 1986. The program has helped teachers with whole language methodologies and has helped them to teach diagnostically. (See *Appendix J.*) In a follow-up study on implementation, teachers remarked on the usefulness of the program not only for classroom purposes but also for reporting to parents in more specific ways than they had previously. Students' performance in reading improved markedly in classrooms where the Diagnostic Reading Program is used (Alberta Education, 1989).

The Diagnostic Mathematics Program is just now available. This program is intended to help teachers unlock the mystery of mathematics for students. (See *Appendix K.*) The focus is on the "how" and "why" of mathematics rather than just the product or the "what". Assessment activities address understandings in the concrete, pictorial, and symbolic modes, and follow-up instruction makes heavy use of manipulatives. Teachers are being inserviced in the use of the program at present.

A third diagnostic evaluation program is nearing completion (Alberta Education, 1990a). It is designed for teachers of students in junior high school and high school (grades 7-10). The core of this program is how students use language to learn. We provide criteria to help teachers look at language use in science, social studies, and language arts. These criteria are based on a model of learning and communication which identifies six language processes basic to all subjects. (See *Appendix L.*)

The model reflects the movement from the familiar - from what is close to oneself - to new, more generalized understandings. Personal, informal language is seen as an essential means of making this connection and achieving insights. The processes of exploring, narrating, imagining, and empathizing reflect this, as well as the importance of feelings in the development of understanding.

All of the processes are seen to interact, as an individual uses language to develop an increasingly refined understanding of a concept or experience. However, the process of monitoring is seen as pervasive in learning and thus a particularly important partner to each of the other five processes.

We have developed checklists that highlight several key behaviors associated with each of the processes. (See *Appendix M.*) More detailed descriptions of these behaviors are provided in a set of descriptive scales which identify performance criteria for each process. (See *Appendix N.*) The criteria are categorized as strong, satisfactory, limited, and weak.

Both the checklists and the descriptive scales have been revised and refined through field testing. They provide valid and reliable criteria for observing student language and behavior in a classroom and for analysing student work or tapes of student interaction. By using the criteria, teachers can gain information that is very useful in planning instruction so as to capitalize on students' strengths.

Teachers who have been involved in the pilot phase of this program have expressed surprise at some of the insights they have gained about individual students' learning. They have also expressed pleasure about the fact that the processes highlighted in the program model seem compatible with those found in subject models of human learning - for example, the scientific method and problem-solving processes used to organize knowledge in the mathematics and sciences.

Performance-based Assessment Activities

In the interests of extending the range of student performance being assessed by our Achievement Testing Program, we are piloting several types of performance-based assessment in addition to written-response activities. Last spring, we carried out a pilot project on the use of portfolios to systematically gather information on student achievement. Although portfolio assessment is classroom based, we wanted to examine the possibility that it can also be used at the provincial level to help us report on what students know and can do by the end of grades 3, 6, and 9.

Our pilot involved four classrooms - 120 students, both rural and urban. Specific assessment activities in math, science, social studies, and language arts were included. Teachers carried out the activities during May and June, fitting them into classroom work. Twenty-one grade 3 teachers representing a cross section of Alberta teachers read the portfolios, using holistic scoring guides as a basis for assessing the work. Both the teacher markers and the classroom teachers recorded their observations about the student work.

Teacher comments indicated that they liked the idea of using portfolios and learned a great deal about their students. They appreciated the chance to intentionally observe their students' process skills and to discuss what students were able to do. Many said they would do more of this kind of assessment in their classes.

In language arts, where students had been asked to pick a "best piece", teacher markers were disappointed with the choices. They were surprised that the writing was not better than that done on the provincial achievement tests. This result may have implications for how teachers use portfolios in class work. The result may also indicate a need for attention to students' self-evaluation or to the types of writing tasks and procedures that are used in the assessment.

We learned from this pilot. It showed us the importance of clarifying expectations about the assessment tasks at the outset. For example, we see the importance of asking for all kinds of writing. We need to be sure the teachers understand the assessment task uniformly. As well, we got valuable feedback on scoring math work. For example, we discovered that giving

marks for process is problematic, since some students can see an answer right away and can lose marks if they do not plod their way through a number of steps that are expected - i.e. if they do not use the "process" we expect.

This year we are extending the pilot project. Grade 3 teachers from twelve school districts in the province will collect selected items in a portfolio on each of their students. The assessment information will be collected in the course of regular instructional activities related to language arts, social studies, mathematics, and science. "Best pieces" of work will be selected by the student and teacher, and the focus will be on four interdisciplinary areas of learning: participation skills, oral communication skills, problem-solving skills, and process skills in science. The portfolios will also contain students' self-assessments, including written reflections on themselves as learners.

To help teachers collect the assessment information in a consistent way, we are providing checklists for observing oral communication, and holistic scoring guides for evaluating problem-solving activities. Teachers will keep anecdotal records of students' participation skills, as well.

In addition to this portfolio project at the grade 3 level, we are working with grade 6 and grade 9 teachers who will field test specific assessment activities in science and mathematics. Also, grade 9 teachers are developing observation criteria for assessing group participation skills in social studies work. Although these are "add-on" activities for our Achievement Testing Program this year, teachers' responses have been very positive. They see the project as a very useful means of gaining information about their students' strengths and weaknesses in a broad range of learnings.

CONCLUSION

The concept of *authentic assessment* has been very useful to us. It has served as an organizing concept for introspection and renewal. As a result, it has revealed more clearly than ever why certain aspects of our assessment programs are effective, and it has led to some exciting refinements. It has helped us reaffirm our key principles:

1. Assessment is based on clear expectations for student performance.

2. Assessment recognizes the central role of language in learning.

3. Assessment provides models for good teaching.

What does the future hold for us? We know that our assessment programs will continue to improve. We want to focus more than ever in the future on what is essential to students' achieving all they are capable of, both inside and outside school. We are interested in describing achievement in terms of profiles that show the levels of learning attained by students. We want to find ways of improving the reliability of our "softer" assessment strategies too. Authentic assessments, in the form of performance-based activities, are not likely to replace achievement tests, but we believe that such alternative approaches will be an effective way of adding to the information we get from well-designed tests.

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APPENDIX A

DIPLOMA EXAMINATIONS PROGRAM
Performance Standards for Biology 30

Students of Biology 30 have developed their aptitude for observing, collecting facts, forming generalizations, hypothesizing, and making inferences from observations. They have shown growth in their understanding of biological concepts by their increased ability to apply these concepts to relevant situations and to communicate in the specialized language of biology.

Students who attain an acceptable standard of performance in Biology 30 receive a final mark of 50 percent or higher. They can demonstrate a basic understanding of the nature of scientific investigation by designing and interpreting simple laboratory tests. They can readily interpret data that are presented in simple graphs and tables, and can translate symbolic representations of biological functions into word descriptions. They can recognize readily and provide definitions for key biological terms. These students can demonstrate an acceptable level of understanding of biological concepts by tracing the pathways that materials follow as they are transported through human organ systems, by sequentially ordering the major steps of a physiological process, and by formulating simple structural and functional comparisons among components of human organ systems. They can relate human physiological concepts to common everyday experiences, but they may have difficulty relating these concepts to health problems. These students can compose clear, logical, descriptive or explanatory statements about major human physiological concepts.

Students who attain a standard of excellence in Biology 30 receive a final mark of 80 percent or higher. In addition to meeting the expectations for an acceptable standard of performance, these students demonstrate their ability and interest in biology and feel confident about their abilities. They can readily interpret interrelated sets of data such as complex graphs and tables. When presenting scientific data, they select the most appropriate form. These students can analyse and evaluate experimental designs. They can easily identify significant parts of human organs and can describe their functions clearly and accurately. They can analyse human physiological problems that involve several interrelated steps, and they can form inferences from extracurricular data that are provided with the problem. These problems would most likely involve regulatory feedback loops and/or a minimum of two interacting human organ systems. Exceptional students can communicate clearly and concisely, using appropriate scientific vocabulary. Multiparagraph compositions are within their grasp.

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APPENDIX B

DIPLOMA EXAMINATIONS PROGRAM
Examination Blueprint for Biology 30

Structure of the Examination

Each Biology 30 diploma examination is designed to reflect the core concepts outlined in the *Program of Studies for Senior High Schools*. The examination is limited to those objectives that can be measured by a paper and pencil test.

Core Content

The core content for the 1991 Biology 30 diploma examinations is emphasized as follows:

Core Content	Per Cent Emphasis
Cellular Processes	9
Homeostatic Mechanism	4
Nutrition and Digestion	16
Body Fluids	15
Breathing, Gas Exchange, and Transport	7
Energy Release	5
The Kidney	10
Regulation of the Internal Environment	20
Voluntary Movement and Body Support	4
Human Reproduction	10

Design

The design of the 1991 Biology 30 diploma examinations is as follows:

Question Format	Number of Questions	Per Cent Emphasis
Multiple Choice	70	70
Written Response	7	30

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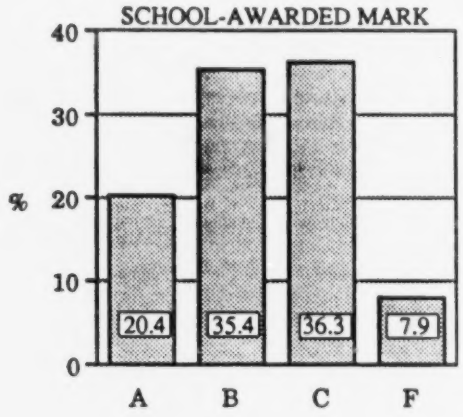
Examination Specifications

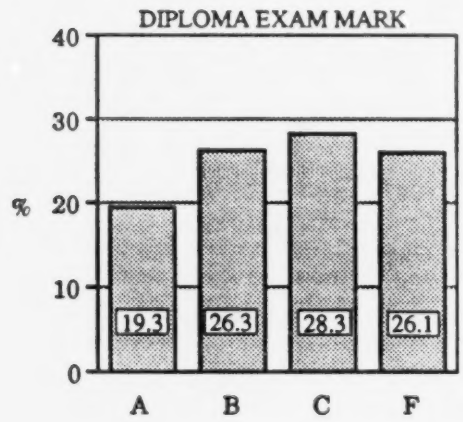
The three cognitive levels of Knowledge, Comprehension and Application, and Higher Mental Activities are addressed throughout the examination. The emphasis on each cognitive level for each section of the examination is as follows:

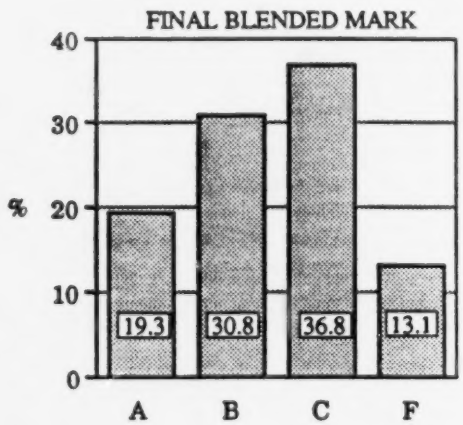
	Per Cent Emphasis
Multiple Choice	
Knowledge	25
Comprehension and Application	35
Higher Mental Activities	10
Written Response	
Comprehension, Application, Higher Mental Activities	30

Each examination is built as closely as possible to the above specifications. Small adjustments in the emphasis may be necessary when a four- or five-mark written-response question covers more than one concept level.

Biology 30 Diploma Examination Results







The summary information in this report provides teachers, school administrators, students, and the general public with an overview of results from the January 1991 administration of the Biology 30 Diploma Examination. The information is most helpful when used in conjunction with the detailed school and jurisdiction reports that have been mailed to schools and school jurisdiction offices. An annual provincial report containing a detailed analysis of the combined January, June, and August results will be available by the end of 1991.

DESCRIPTION OF THE EXAMINATION

The Biology 30 Diploma Examination consists of two parts: a multiple-choice section of 70 questions worth 70% and a written-response section of seven questions worth 30%.

ACHIEVEMENT OF STANDARDS

The information reported is based on the final blended marks achieved by 8 630 students who wrote the January 1991 examination.

- 86.9% of these students achieved the acceptable standard (a final blended mark of 50% or higher).
- 19.3% of these students achieved the standard of excellence (a final blended mark of 80% or higher).

PROVINCIAL AVERAGES

- The average school-awarded mark was 66.8%.
- The average diploma examination mark was 62.2%.
- The average final blended mark, representing an equal weighting of the diploma examination and school-awarded marks, was 64.9%.

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Alberta EDUCATION

SUBTEST RESULTS

When analysing any detailed examination results, please bear in mind that subtest results cannot be directly compared. Results are in average raw scores.

Machine scored: 46.1 out of 70

Written response: 16.0 out of 30

- Course Content
  - Cellular Processes: 5.8 out of 9
  - Homeostatic Mechanisms: 2.7 out of 4
  - Nutrition and Digestion: 7.3 out of 14
  - Body Fluids: 9.2 out of 15
  - Breathing, Gas Exchange, and Transport: 4.6 out of 7
  - Energy Release: 3.3 out of 5
  - The Kidney: 6.2 out of 10
  - Regulation of the Internal Environment: 13.6 out of 22
  - Voluntary Movement and Body Support: 2.6 out of 4
  - Human Reproduction: 6.8 out of 10
- Process Skills: 20.5 out of 37
  - Multiple-choice questions 3, 5, 11, 15, 29, 31, 34, 36, 50, 55, 56, and 70, and written-response questions 1, 2, 3, 4, 6, and 7.
- Cognitive Levels
  - Knowledge: 16.8 out of 25
  - Comprehension and Application: 33.2 out of 55
  - Higher Mental Activities: 12.2 out of 20

EXAMINATION BLUEPRINT

Each question on the examination is classified in two ways: according to the curricular content area being tested and according to the cognitive level demanded by the question. The examination blueprint illustrates the distribution of questions in January 1991 according to these classifications. Numbers with square brackets [ ] indicate written-response questions, and those without brackets indicate multiple-choice questions.

Reporting Category	Questions by Cognitive Level			Examination Emphasis (%)
	Knowledge	Comprehension and Application	Higher Mental Activities	
Cellular Processes	4, 6	1, 2, 3, [1]	5	9
Homeostatic Mechanisms		7	[4]	4
Nutrition and Digestion	8, 9, 12, 13, 14	10, [2]	11, 15	14
Body Fluids	16, 19, 22, 23	17, 18, 20, 21, 24	[3]	15
Breathing, Gas Exchange, and Transport	25, 26	27, 28, 30, 31	29	7
Energy Release	32	33, 34, 35	36	5
The Kidney	37, 39	38, 40, 41, 42, 43, [7]		10
Regulation of the Internal Environment	44, 47, 51, 52, 54	45, 46, 48, 49, 53, [5], [6]	50, 55, 56	22
Voluntary Movement and Body Support	57	58, 59, 60		4
Human Reproduction	61, 63, 69	64, 65, 66, 67	62, 68, 70	10
Examination Emphasis (%)	25	55	20	100

RESULTS and EXAMINERS' COMMENTS

The examination has a balance of question types and difficulties. It is designed so that students capable of achieving the acceptable standard would obtain a mark of 50% or higher and students achieving the standard of excellence would obtain a mark of 80% or higher. This examination is parallel in structure to the 1990 Biology 30 examinations and produced a similar distribution of letter grades (compare Figure 2-15 of the *Annual Report, Diploma Examinations Program*, School Year 1989-90). The number of students who received blended marks in Biology 30 this January in comparison to January 1990 increased by 6.4%. Approximately 14.4% of the students who wrote the Biology 30 Diploma Examination in January 1991 had also written at least one Biology 30 diploma examination in 1990. This subpopulation (1 247) achieved an examination mean that was three per cent lower than the mean achieved by the total population (8 630).

Students who were successful on the examination demonstrated a clear understanding of biology concepts that goes beyond rote memorization and recall of textual material.

MULTIPLE CHOICE

QUES.	KEY	DIFF.*	QUES.	KEY	DIFF.	QUES.	KEY	DIFF.	QUES.	KEY	DIFF.	QUES.	KEY	DIFF.
1	D	78.9	15	D	39.4	29	A	85.7	43	B	56.4	57	B	89.1
2	D	68.0	16	B	55.4	30	A	69.7	44	B	74.8	58	D	76.1
3	A	70.8	17	C	77.9	31	B	38.9	45	C	75.3	59	B	37.6
4	B	58.0	18	C	46.7	32	A	63.7	46	A	55.1	60	C	60.3
5	A	57.3	19	C	77.6	33	A	64.3	47	A	70.8	61	A	71.8
6	D	66.3	20	B	75.6	34	C	49.8	48	C	77.1	62	C	55.5
7	C	69.9	21	C	59.3	35	D	83.6	49	C	71.2	63	B	61.1
8	B	56.1	22	B	60.1	36	C	70.0	50	B	67.4	64	C	80.8
9	A	74.4	23	D	64.4	37	D	57.9	51	B	77.8	65	A	66.3
10	C	53.4	24	A	65.4	38	B	72.7	52	D	60.3	66	A	79.4
11	C	79.1	25	C	77.8	39	A	60.2	53	C	63.3	67	C	73.1
12	D	43.0	26	A	68.7	40	D	77.5	54	D	64.6	68	D	66.1
13	A	82.7	27	D	77.4	41	B	70.7	55	A	47.5	69	B	69.4
14	B	74.7	28	D	41.9	42	D	72.9	56	A	56.5	70	A	51.3

*Difficulty – percentage of students answering the question correctly

MULTIPLE CHOICE (continued)

Students who achieved the acceptable standard demonstrated an understanding of key biological terms by identifying appropriate applications and examples (questions 1, 4, and 32). These students could associate diagrammatic representations of body structures with their corresponding functions (questions 10, 24, and 49). They also had sufficient understanding of biological concepts to identify logical descriptions of cause-and-effect relationships (questions 30, 43, and 65).

Students who achieved the standard of excellence demonstrated the ability to interpret complex experimental data (questions 5, 55, and 70). They also could analyse an investigative apparatus and then identify parallels between its operation and the functions of the human body (questions 31 and 34).

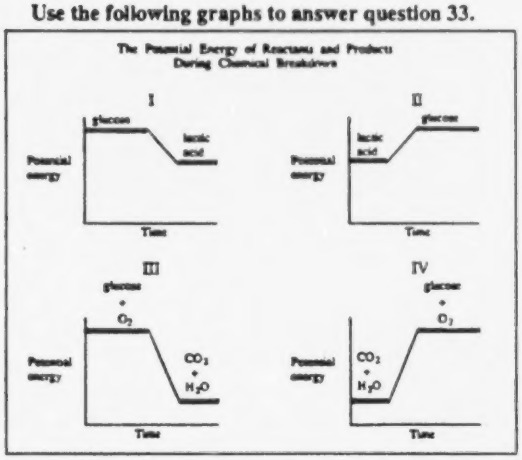
Detailed comments follow on three questions, presented in the order of increasing cognitive level.

37. The function of the proximal tubule of the nephron is to

A. initiate the formation of urea
B. filter material from the blood
C. reabsorb urea into the blood
*D. return material to the blood

Question 37 required students to know which part of the nephron is named proximal tubule and then to recall its specific function. In order to identify the correct answer, however, students had to understand the difference between filter and reabsorb, as well as between urea and urine. This clarity of knowledge distinguished those students who achieved the standard of excellence (A) from those who did not achieve the acceptable standard (F). Of the students who obtained an A on the examination, 92.6% selected the correct response, whereas only 25.6% of the students who obtained an F selected the correct response.

Use the following graphs to answer question 33.



33. The graphs that illustrate aerobic and anerobic respiration respectively are

*A. III and I
B. III and II
C. IV and I
D. IV and II

Question 33 required students to recall the meaning of key biological terms, to distinguish between chemical reactants and products, and to interpret graphs that depicted changes in potential energy. This multistep process-skill question was correctly answered by 92.4% of the students who achieved the standard of excellence (A) on the examination. Of the students who obtained a B or C level of achievement, 67.7% selected the correct answer, whereas only 36.5% of the students who failed the examination selected the correct answer. Many students did not understand the difference between reactants and products, and therefore chose graphs that depicted the chemical sequence in reverse. Other students confused the changes in potential energy over time with the relative amounts of energy released by anaerobic versus aerobic respiration, and chose a pair of graphs that were opposite in the direction of energy change.

Use the following information to answer question 56.

Many drugs influence autonomic nervous functions. The table describes the action of four drugs.

Drug	Action
Ephedrine	stimulates release of noradrenaline from sympathetic nerve endings
Reserpine	inhibits sympathetic activity by preventing the synthesis of noradrenaline
Neostigmine	blocks the action of cholinesterase at neuromuscular junctions
Pilocarpine	produces parasympathetic effects

56. Which drug would cause an increase in blood pressure?

*A. Ephedrine
B. Reserpine
C. Neostigmine
D. Pilocarpine

Question 56 required students to recall the major factors that directly determine blood pressure (heart action, vessel size). Next they had to analyse the data provided about the drugs so as to determine each drug's effect on the components of the autonomic nervous system. It was then necessary to determine how the drug-induced changes in the nervous system would affect heart action and/or vessel size. Finally, selection of a drug that would increase blood pressure could be made. This multistep problem was solved correctly by 83.1% of the students who achieved the standard of excellence (A) on the examination, whereas 56.9% of the students who obtained a B or C level of achievement solved it correctly and only 35.9% of the students who failed the examination selected the correct answer.

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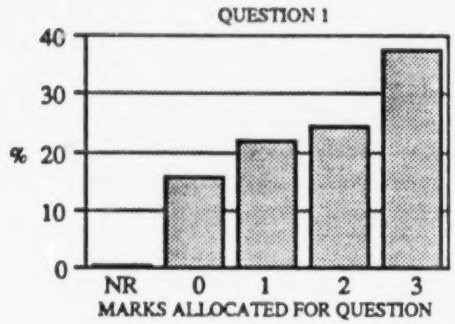
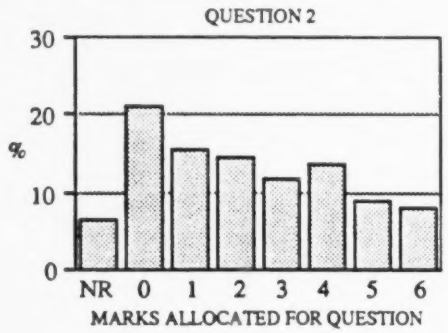
WRITTEN RESPONSE

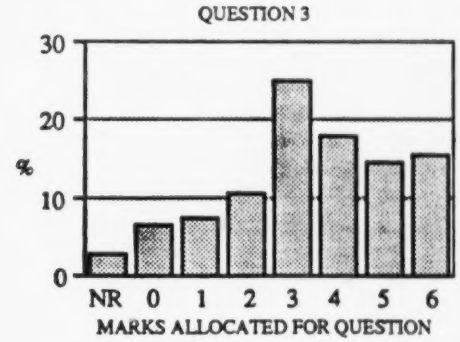
The seven questions in the written-response section are designed to measure achievement on seven of the 10 content strands for Biology 30. All the questions went beyond measuring simple recall of information. Questions 1 and 2 required students to analyse laboratory investigations, and questions 3 and 5 required students to integrate concepts from two content strands. Questions 4 and 6 required students to interpret graphs, evaluate conclusions, and form generalizations. Question 7 required students to explain a common societal situation in terms of physiological processes. The overall quality of student responses showed some improvement in comparison to the responses on the 1990 January and June examinations. The average percentage of no responses was approximately 2.4, a significant decrease from 3.7 for January and June 1990.



Question 1: Most students identified the correct diagrams for all three parts of the question, but approximately 62% gave incomplete explanations to support their choices. Good explanations were given for distilled water, but many students inaccurately explained hypertonic and isotonic solutions. These students confused the concept of concentration with amount. Another common misconception was that salt enters the cell and pushes water out. Some students did not describe both solutions (beaker/cell) when providing comparisons. On this 3-mark question, the average mark was 1.84 for 61% of the available mark.

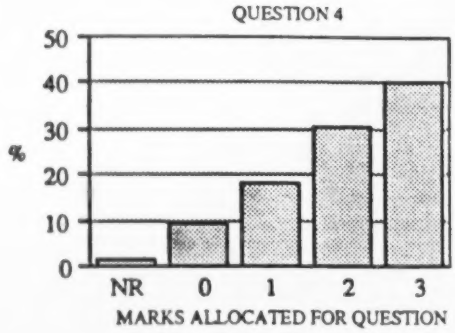
Question 2: The fact that this question proved to be the most difficult in the written-response section indicates that the students did not understand chemical digestion from a laboratory perspective. Most students understood that pepsinogen "works" best in an acidic environment and that bile "helps" in fat digestion, but precise explanations and correct procedures for little or no chemical digestion were either inaccurate or absent. Many students thought that distilled water (diluted the enzyme) or heat (denatured the enzyme) prevented chemical digestion. Some students did not recognize the category of food present (egg white/protein, olive oil/lipid). Many students said identification reagents such as Benedict's solution should be added to bring about chemical digestion. On this 6-mark question, the average mark was 2.28 for 38% of the available mark.



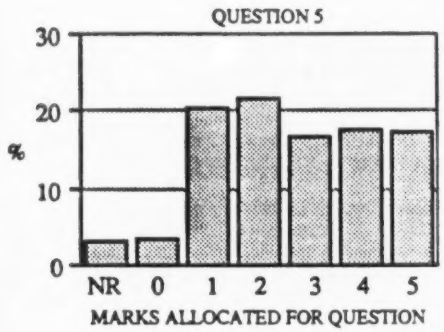


Question 3 generated student responses that reflected a level of understanding above what was expected. Most students could easily identify two significant differences between the two circulatory patterns. Many students then went on to describe the functional implications of the structural differences. It was at this point that misconceptions and weak communication skills became evident. Some students stated that the mother or the placenta pumps blood for the fetus. Others stated that the mother produces blood for the fetus and therefore the mother and fetus share the same blood. Many students limited their descriptions to one of the two circulatory systems and therefore failed to make meaningful comparisons. Too many students presented general functional differences without relating them specifically to the structural differences (newborn uses its lungs). Nevertheless, it should be noted that 30% of the students achieved the standard of excellence on this question. On this 6-mark question, the average mark was 3.40 for 57% of the available mark.

WRITTEN RESPONSE (continued)

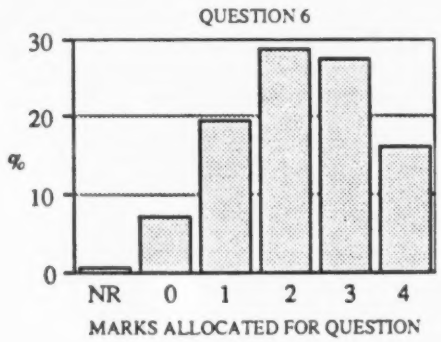


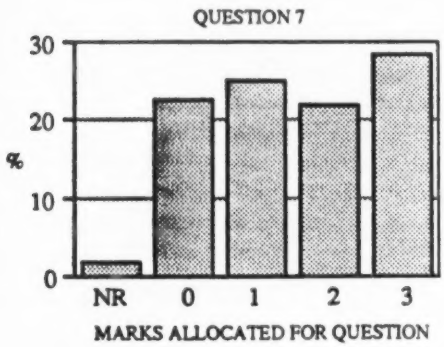
Question 4 was well answered by many students (40.1%). Most students easily recognized that statements a and c were supported by the data presented and that statement b, although true, was neither supported nor negated. Some students restated the assertions instead of using data from the graph to support them. Some students did not seem to understand the meaning of "alkalinity" or "optimal activity." On this 3-mark question, the average mark was 1.99 for 66% of the available mark.



Question 5: Most students understood the format of this question and therefore attempted to complete the chart. Students who achieved the standard of excellence on the examination obtained a mean score of 4.26 out of 5 marks (85%) on this question. Students who did not achieve the acceptable standard obtained a mean score of 1.33 (27%). These students did not understand the significance of diagrams I and II and therefore interchanged hormones and enzymes. They also named substances that are secreted by organs other than the pancreas (small intestine). Some students did not observe the level of specificity indicated by the examples and so gave general answers (pancreatic juice, insulin controls blood sugar). On this 5-mark question, the average mark was 2.70 for 54% of the available mark.

Question 6: Students who obtained a zero mark for part a of this question either did not include the correct unit with their numerical answer or interpreted the vertical axis as presenting a multiplicative increase rather than an additive increase in the number of decibels (20 x instead of 20 dB). Many students had difficulty in accurately communicating their generalization for part b. Because of the sentence syntax or choice of vocabulary, the opposite meaning to what the writer most likely intended was given. Most students identified a manipulated variable represented by the data, but many did not identify or correctly describe the responding variable. On this 4-mark question, the average mark was 2.25 for 56% of the available mark.





Question 7: Many students obtained a maximum of one mark for this question because they focused on the increase in liquid consumption rather than on the depressant effects of alcohol. Furthermore, these students did not understand the concepts of reabsorption and concentration in reference to water. Too many students discussed changes in concentration of urine in terms of acidity, color, or volume. The students who achieved the standard of excellence on the examination, however, obtained a mean score of 2.62 out of 3 marks (87%). On this 3-mark question, the average mark was 1.54 for 51% of the available mark.

For further information, contact Lowell Hackman, Yvonne Johnson, or Phill Campbell at the Student Evaluation Branch, 427-2948.

APPENDIX D

GRADE 12 DIPLOMA EXAMINATION
ENGLISH 30 - Part A: Written Response

DESCRIPTION

Part A: Written Response contributes 50 percent of the total English 30 Diploma Examination mark and consists of *TWO* assignments:

MINOR ASSIGNMENT: Personal Response to Literature

Suggested time: approximately ½ hour
Value: 30 percent of this examination

MAJOR ASSIGNMENT: Literature Composition

Suggested time: approximately 1½ to 2 hours
Value: 70 percent of this examination

TOTAL TIME: 2½ hours

Instructions

1. Read the poem *"Envy"* carefully and thoughtfully before you start the writing assignments.

2. Read *BOTH* the Minor and Major assignments before you start writing.

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ENVY

I envy.
This secret
I have not revealed before.
I know
there is somewhere a boy
whom I greatly envy.
I envy
the way he fights;
I myself was never so guileless and bold.
I envy
the way he laughs --
as a boy I could never laugh like that.
He always walks about with bumps and bruises;
I've always been better combed,
intact
He will not miss
all those passages in books
I've missed.
Here he is stronger too.
He will be more blunt and harshly honest,
forgiving no evil for any good it may bring;
and where I'd dropped my pen:
"It isn't worth it . . ."
he'd assert:
"It's worth it!"
and pick up the pen.
If he can't unravel a knot,
he'll cut it through,
where I can neither unravel a knot,
nor cut it through.
Once he falls in love,
he won't fall out of it,
where I keep falling in
and out of love.
I'll hide my envy.
Start to smile.
I'll pretend to be a simple soul:
"Someone has to smile;
someone has to live in a different way . . ."
But much as I tried to persuade myself of this,
repeating:
"To each man his fate . . ."
I can't forget there is somewhere a boy
who will achieve far more than I.

Yevgeny Yevtushenko
Translated by George Reavey

"Envy" by Yevgeny Yevtushenko, translated by George Reavey. Translation from *Modern European Poetry* by Willis Barnstone, Editor; copyright © 1966 by Bantam Books, Inc. Used by permission of Bantam Books, a division of Bantam, Doubleday, Dell Publishing Group, Inc.

12.

MINOR ASSIGNMENT: Personal Response to Literature
(Suggested time: approximately 30 minutes)

In the poem *"Envy"*, the speaker describes behavior that he considers to be ideal: more advantageous, desirable, or acceptable than his own.

Choose a quotation from the poem that you associate with an experience of desiring an ideal. Describe how this desire affected your attitude or behavior.

MAJOR ASSIGNMENT: Literature Composition
(Suggested time: approximately 1½ to 2 hours)

A common human impulse is the desire for that which represents an ideal. An ideal may be represented in the physical, intellectual, moral, practical, or emotional attributes of another person or way of life. Literature offers many examples of the ways in which individuals are influences by an ideal. For example, in the poem "Envy", Yevgeny Yevtushenko uses contrast to suggest that the concept of an ideal may be a persistent influence in people's lives.

Write a composition based on other literature you have studied in which the author examines the ways that an ideal influences behavior. What ideas does the author develop regarding the influence of an ideal on individual behavior? Provide specific details from the literature you choose that will support and develop your controlling idea.

Guidelines for Writing

- *CHOOSE* your selection from relevant short stories, novels, plays, poems, other literature or films that you have studied in your high school English classes. You may choose to discuss more than one selection.
- *FOCUS* your composition on the topic. Provide only those details that support your controlling idea. You may wish to consider discussing the significance of the author's use of such elements as character development, setting, irony, contrast, conflict, imagery, symbol, etc.
- *ORGANIZE* your composition so that your ideas are clearly and coherently developed.

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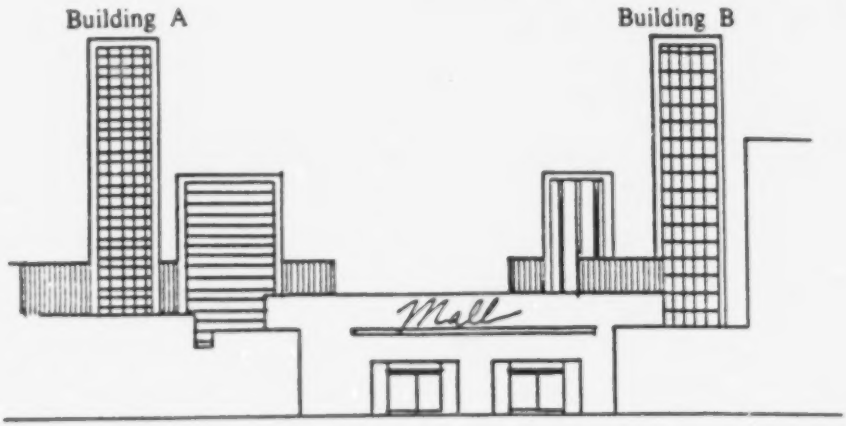
APPENDIX E

GRADE 12 DIPLOMA EXAMINATION
PHYSICS 30

Use the following information to answer question 4.



Building A and B are each 25 stories tall. Between them are a large shopping mall and other smaller buildings. The distance between buildings A and B was measured, using a laser and other electronic instruments, three times per day. The measurements are given in the table:

Distance (m)	Time of day
15 165.67	7:00 a.m.
15 165.35	11:00 a.m.
15 165.12	3:00 p.m.
15 165.53	7:00 a.m.
15 165.22	11:00 a.m.
15 165.18	3:00 p.m.
15 165.58	7:00 a.m.
15 165.31	11:00 a.m.
15 165.20	3:00 p.m.

The laser and other electronic instruments operate on standard 115 V electrical outlets. The laser and auxiliary timing equipment can measure all distances greater than 10 metres to seven significant digits.

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4. a. What is the average measured distance between buildings A and B?

   b. Listed below are three hypotheses to account for variation in the measured distance between buildings A and B. Choose **one** of the hypotheses and design a **practical** experiment to test its validity. A sketch may be helpful. Your experimental design must **control** or **exclude** possible effects suggested by the other two hypotheses. You must also **specifically** state the observations and/or measurements you use in your experiment to evaluate the hypothesis you have chosen.

Hypotheses

(choose **one**)

I. The voltage applied to the laser changes with time, thus affecting the frequency emitted by the laser and, therefore, the measured distance.

II. The refractive index of air depends on temperature.

III. The buildings sway.

Please note that in the practical experiment you design, you do not have to duplicate the distance measurements given on page 22. You may select any suitable equipment in order to test the validity of the hypothesis you choose.

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12. Joe brought this ice cream cone.

He gave the clerk these coins.

The clerk gave him the correct change.

Shade in the coins that the clerk could have given him.

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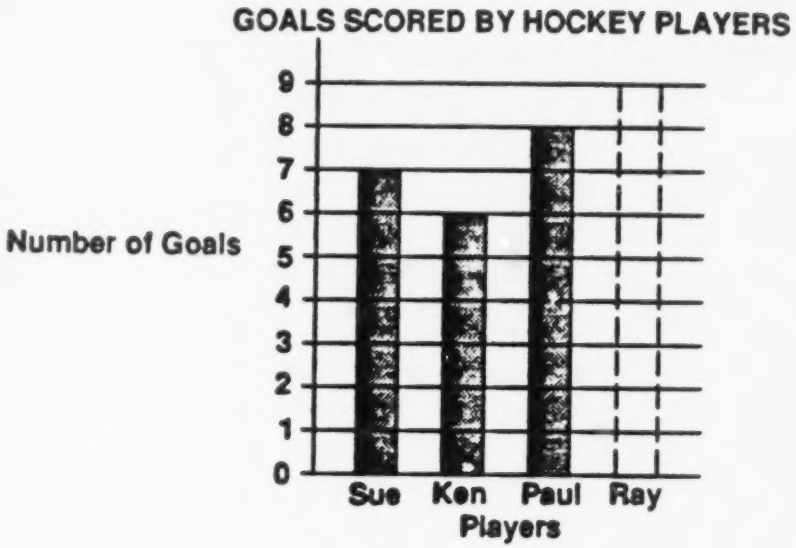
This graph is not complete



21. Ray scored half as many goals as Paul.

    Shade in the bar graph to show Ray's score.

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APPENDIX G

GRADE 12 DIPLOMA EXAMINATION
MATHEMATICS 30

SAMPLE INSTRUCTIONS FOR NUMERICAL-RESPONSE SECTION

PART B

INSTRUCTIONS

In this part of the examination, there are 12 numerical-response questions each with a value of one mark. All numbers used in the questions are to be considered as **exact** numbers and are not the result of a measurement.

Read each question carefully.

Solve each question and write your answer correct to the nearest tenth.

Record your answer on the answer sheet provided by writing it in the boxes of the corresponding answer field and by filling in one circle in **every** column as illustrated. **Use an HB pencil only.**

Sample Questions and Solutions

1. If θ is acute and $\sin\theta = 0.6735$, then the measure of θ correct to the nearest tenth of a degree is _____ .

   $\theta = 42.33777464...°$

   RECORD 042.3

2. For the arithmetic series $-8 + (-5) + (-2) + \ldots + (85)$, the number of terms correct to the nearest tenth is _____ .

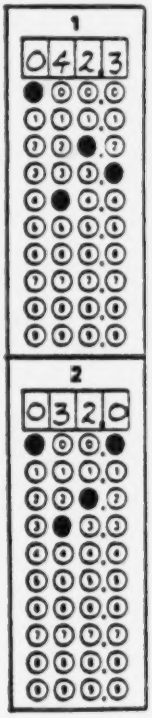
   $85 = -8 + (n - 1)(3)$

   $93 = 3n - 3$

   $n = 32$

   RECORD 032.0

Answer Sheet



If you wish to change an answer, erase **all** traces of your first answer.

NOTE: The perforated pages at the back of this booklet may be torn out and used for your rough work. **No marks** will be given for work done on the tear-out pages.

19.

START PART B IMMEDIATELY.

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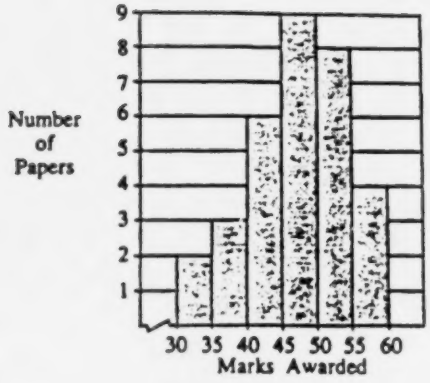
SAMPLE QUESTION

9. The histogram at the right indicates the marks awarded on an examination. One paper is drawn from the file. Correct to the nearest tenth, the probability that it will have a score between 45 and 50 is _____.



RECORD ANSWER ON THE ANSWER SHEET

QUESTION	KEY	DIFFICULTY
9	000.3 or 028.1	60.0

Question 9 required students to interpret a graph and to calculate the probability that an examination paper drawn at random would have a score between 45 and 50. This probability as a fraction was 9/32. Although the question implied that this final probability should be recorded as a decimal, 10% of the students identified this probability as a percentage. As the skill to be tested in this question was interpreting the graph and computing the probability as a fraction, recording the probability as 28.1% was accepted.

APPENDIX H

GRADE 12 DIPLOMA EXAMINATIONS PROGRAM
SOCIAL STUDIES 30

Use the following sources to answer questions 17 to 21.

SOURCE I

Projected federal deficits of $35 to $40 billion each year until the end of the decade would seriously harm Canada's growth prospects. By increasing the federal public debt faster than the economy is growing, these large deficits would absorb an increasing share of Canadians' savings, reducing the amount available for the private investment needed for growth.

-- Edward A. Carmichael,
Policy Review and Outlook, 1985: A Time for Decisions

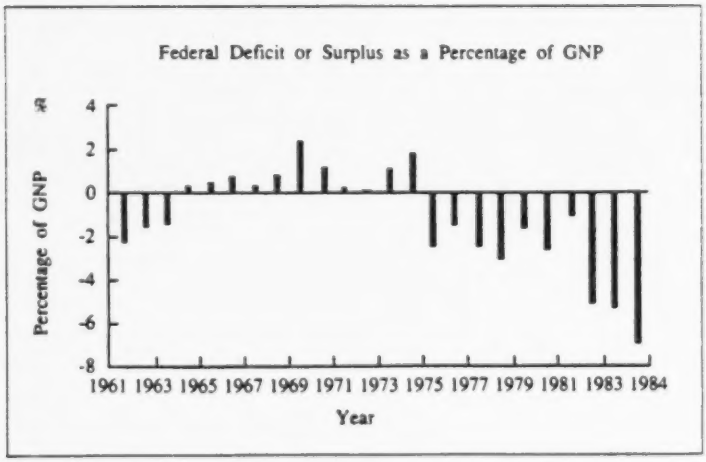
SOURCE II

Public opinion often tends to judge deficit as evidence of economic trouble and sometimes as a firm proof of fiscal irresponsibility. Government deficits are inherently neither bad nor good. What matters about deficits is their impact on people.

-- Economic Council of Canada
Seventeenth Annual Review, 1980

SOURCE III

Federal Deficit or Surplus as a Percentage of GNP



-- from *Canadian Macroeconomics*

17. What is the relationship between the opinions expressed in sources I and II?

A. Both speakers would favor low interest rates as a policy to reduce the national debt.

B. Both speakers would oppose raising taxes as a policy to reduce the national debt.

C. The speaker in source I opposes a large public debt whereas the speaker in source II is neutral.

D. The speaker in source II recognizes the need for public debt whereas the speaker in source I wants a balanced budget.

18. The speaker's underlying assumption in source I is that

A. fiscal restraint is the enemy of business expansion
B. economic well-being is achieved by investment growth
C. deregulating the economy encourages a huge public debt
D. economic growth is encouraged by a more equitable society

19. The opinion expressed in source I would be strongly challenged by

A. an investment broker who opposes new taxes
B. a voter who favors a market-oriented political party
C. a social democrat who favors expanded welfare programs
D. a capitalist who opposes restrictions on business expansion

20. In source III, the trend from 1975 to 1984 **most** likely resulted from government

A. spending to counter recessionary pressures
B. cutbacks on regional transfer payments
C. investments in expanding foreign businesses
D. fiscal restraint to prevent inflationary pressures

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21. In order to reverse the trend shown in source III, the speaker in source I would most likely recommend that government

A. increase its own spending and raise corporate taxes
B. decrease its own spending and raise corporate taxes
C. increase its own spending and reduce corporate taxes
D. decrease its own spending and reduce corporate taxes

Sources I-III:

From Policy Review and Outlook, 1985: A Time for Decisions by Edward A. Carmichael (Toronto: C.D. Howe Institute). Reprinted by permission of C.D. Howe Institute.

From Seventeenth Annual Review, 1989 (Economic Council of Canada). Reproduced with the permission of the Minister of Supply and Services, Canada, 1990.

Diagram by Conference Board of Canada from Canadian Macroeconomics (Scarborough, Ontario: Prentice-Hall Canada Inc.). Reprinted by permission of Prentice-Hall Canada Inc.

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APPENDIX I

DIPLOMA EXAMINATIONS PROGRAM
SCORING GUIDE FOR THE WRITTEN-RESPONSE ASSIGNMENT
SOCIAL STUDIES 30 DIPLOMA EXAMINATION, 1991

Scoring Categories

1. Definition of the issue

2. Defense of position

3. Presentation of examples or case studies

4. Quality of language and expression

SCORING GUIDE AND QUESTIONS TO CONSIDER WHEN SCORING THE DIMENSIONS OF THE ESSAY ASSIGNMENT

1. DEFINITION OF THE ISSUE (5 marks)

Students will define the issue by identifying different points of view on the issue and by thoughtfully discussing assumptions underlying these points of view.

What to Look for When Scoring This Dimension

Marks are awarded for the degree to which a writer meets the following requirements:

Requirements	Questions
1. Explanation of the scope of the issue and the nature of the disagreement raised by the issue.	• Does the writer demonstrate understanding of the issue? Does the writer understand why the issue is important? Is the writer aware of the dilemma posed by the issue and of the range of choices inherent in the issue?
2. Thoughtfulness	• Does the writer explain the beliefs, principles, and assumptions that may underlie the different views on the issue? • Does the writer relate personal knowledge and understanding of the issue to a meaningful context? • Does the writer establish an appropriate context for the position taken (thesis) by demonstrating an awareness of the different perspectives underlying other positions on the issue?

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DEFINITION OF THE ISSUE (5 marks)

SCORE	*SCORING DESCRIPTORS*
(5) *EXCELLENT*	The definition of the issue is insightful and mature. A thoughtful and perceptive discussion of the complexity inherent in the issue is comprehensively developed. Analysis of the principles underlying the various positions reveals a sophisticated understanding of the complexity of the issue.
(4) *PROFICIENT*	The definition of the issue is clear and adept. A clear discussion of the complexity inherent in the issue is presented in detail. Explanation of the principles underlying the various positions reveals a competent understanding of the nature of the issue.
(3) *SATISFACTORY*	The definition of the issue is straightforward and conventional. An adequate but generalized discussion of the complexity inherent in the issue is presented but may not be fully developed. Description of the principles underlying the various positions reveals an adequate understanding of the issue.
(2) *LIMITED*	The definition of the issue is incomplete or lacks elaboration. Superficial discussion of the complexity inherent in the issue is present but lacks development and may stem from inaccurate or ill-formed assumptions. Reference to principles underlying the various positions is minimal, revealing a superficial or vague understanding of the issue.

(1) *POOR*	The definition of the issue is minimal. Discussion of the complexity inherent in the issue is disjointed, missing, or inaccurate. Reference to principles underlying the various positions is missing or oblique and off-target.
INS	INSUFFICIENT is a special category. It is not an indicator of quality. It should be assigned to papers that do not contain a discernible attempt to address the issue presented in the assignment or are too brief to assess this or any other scoring category.

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APPENDIX J

DIAGNOSTIC READING PROGRAM

PURPOSE OF THE PROGRAM

The *Diagnostic Reading Program* is intended to help teachers meet the individual needs of students in their classrooms. The program provides teachers with a systematic approach to observing and interpreting students' strengths and weaknesses in reading. It also includes suggestions for follow-up instruction. The program is designed for use during regular classroom instruction.

UNIQUE FEATURES OF THE PROGRAM

The *Diagnostic Reading Program* was developed by Alberta teachers under the direction of Alberta Education. The evaluative instruments were normed on elementary students in Alberta.

The approach to reading in this program is consistent with the *Alberta Elementary Language Arts Curriculum*. Both emphasize *how* students read rather than *what* they know about reading. This program can be used with any language arts program currently used in Alberta classrooms.

A special feature of the *Diagnostic Reading Program* is that it links evaluation to instruction. After interpreting the diagnostic information, the teacher is provided with suggestions for immediate follow-up instruction. As teachers become familiar with the materials in this program, they will be able to assess how a student reads and will immediately know what steps to take. The following chart indicates how assessment and instruction may be integrated to become part of the diagnostic teaching cycle.

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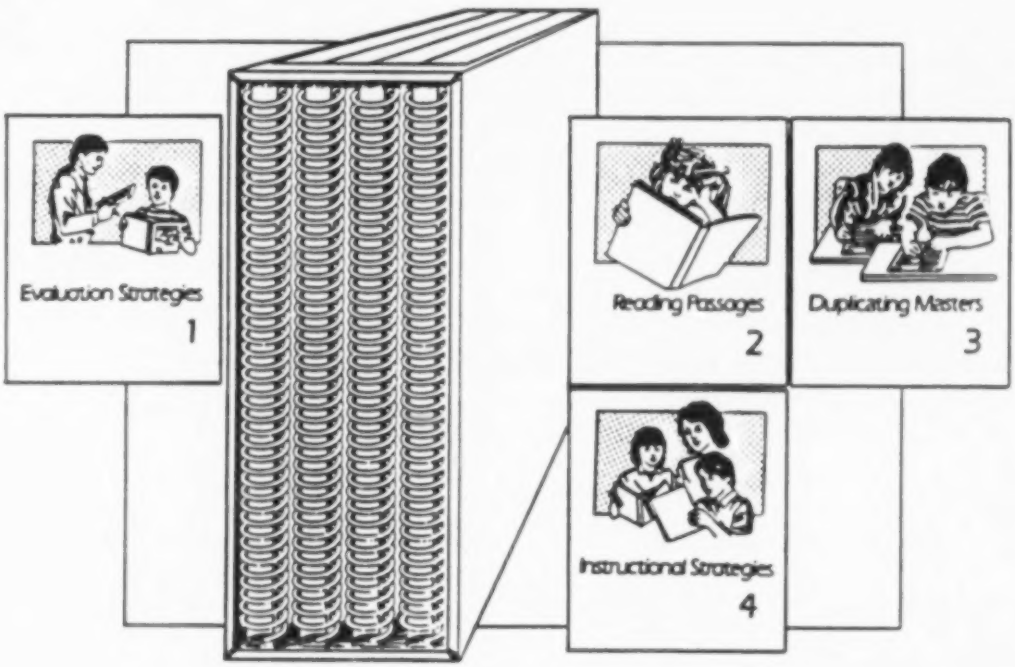
COMPONENTS OF THE PROGRAM

The program has two components: an evaluation component and an instructional component.

The evaluation component (Handbooks 1, 2 & 3) consists of 48 reading passages from mid-Grade 1 to Grade 6 levels, six evaluation strategies to find out about the reading behaviors of students and evaluative materials for each reading passage.

The instructional component (Handbook 4) consists of instructional strategies and techniques that address students' needs as identified by using the evaluation component.



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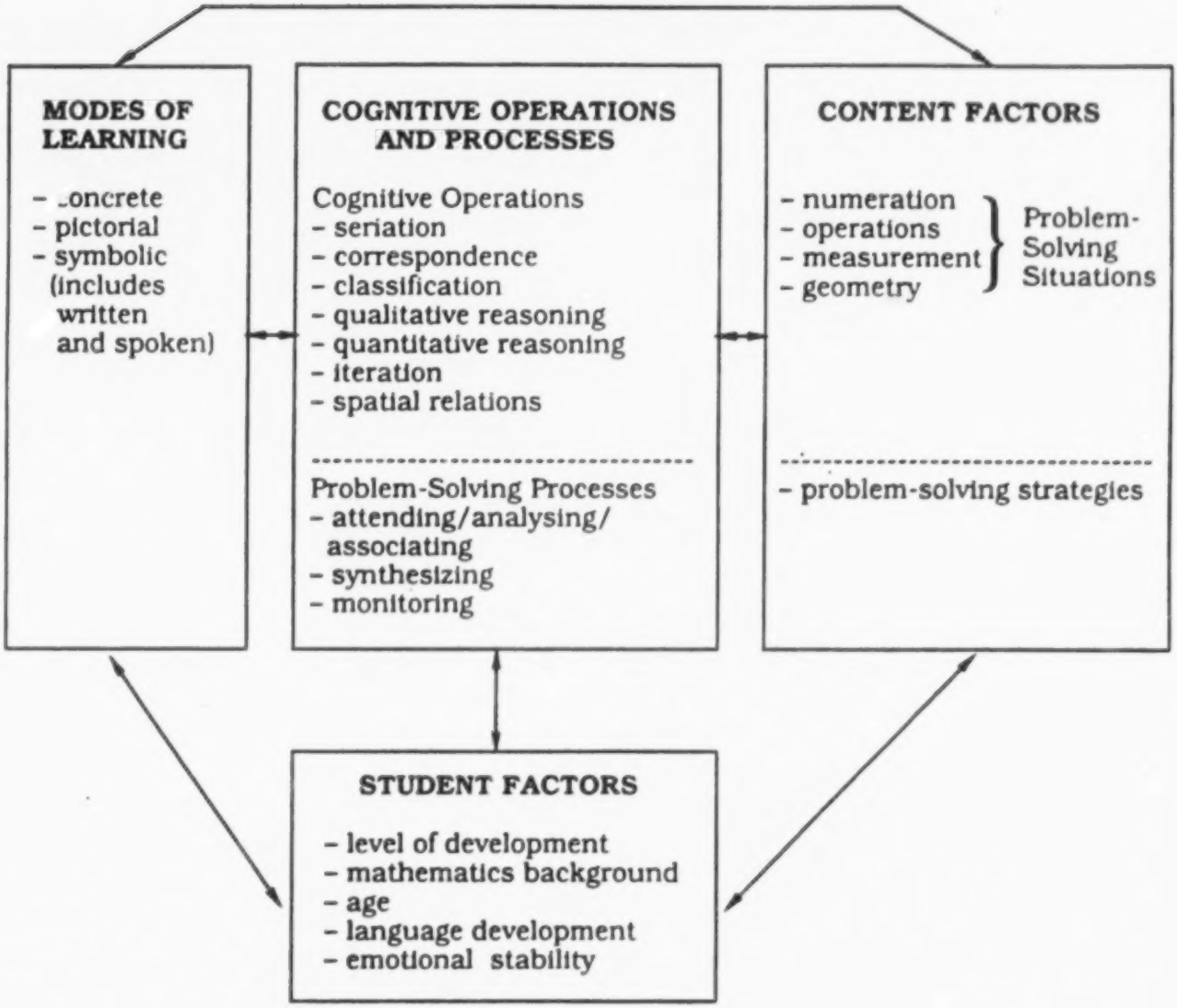
APPENDIX K

DIAGNOSTIC MATHEMATICS PROGRAM

INTERACTIVE MODEL



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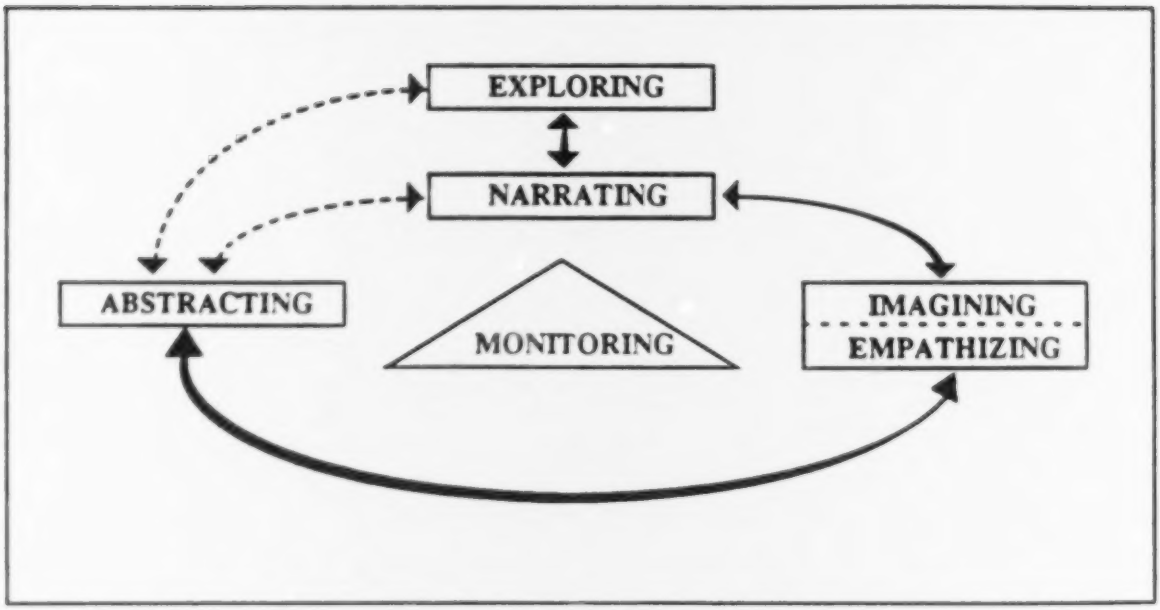
APPENDIX L

DIAGNOSTIC LEARNING AND COMMUNICATION PROCESSES PROGRAM

Processes Involved in Learning and Communication



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APPENDIX M
DIAGNOSTIC LEARNING AND COMMUNICATION PROCESSES PROGRAM

OBSERVATION/PROFILE SHEET

PROCESS	Examples/anecdotal comments/tally marks	Strong S	Strong S	Weak L	Weak W
Exploring (discovering personal knowledge and making new connections) remembers, asks, guesses, "tinkers", "digs", researches					
Narrating (telling about experiences in order to organize them and to understand their significance) selects, recounts, orders, reports, shares					
Imagining (creating and transforming mental images) compares, describes, visualizes, "dreams", uses metaphor					
Empathizing (understanding the perspectives of others) trusts, respects, encourages, paraphrases, takes on role					
Abstracting (moving beyond concrete thought) classifies, generalizes, hypothesizes, theorizes, symbolizes, evaluates					
Monitoring (regulating thought and language) reconsiders, plans, decides, adapts, facilitates, persists					

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APPENDIX N

DIAGNOSTIC LEARNING AND COMMUNICATION PROCESSES PROGRAM

- Who is the program for?

  Secondary school teachers of English language arts, social studies and science.

- What is its purpose?

  To help teachers identify their students' strengths and weaknesses in important learning and communication processes. With this information, teachers will be able to design instructional approaches that will help students become better learners and develop more effective communication skills in each of the three subject areas.

- How does the program work?

  Teachers carry out diagnostic evaluation of students' learning and communication processes while the students are engaged in the learning activities of their regular program of studies. The diagnostic teaching units in each subject area provide a model of how this can be accomplished. The shaded areas of the lesson plans show where and how diagnostic information would be collected.

- Won't this be very difficult to do?

  The program recognizes that teachers, like students, need to be able to approach new ideas and ways of doing things at a pace that is comfortable for them. Therefore, we recommend that they start by making random observations of the learning and communication processes they can observe as their classes are working. When they feel comfortable with the program, we suggest they select one to three students only to focus on intensively. Gradually, as they become more familiar with the program, they will begin to apply it automatically to their observation of students' work.

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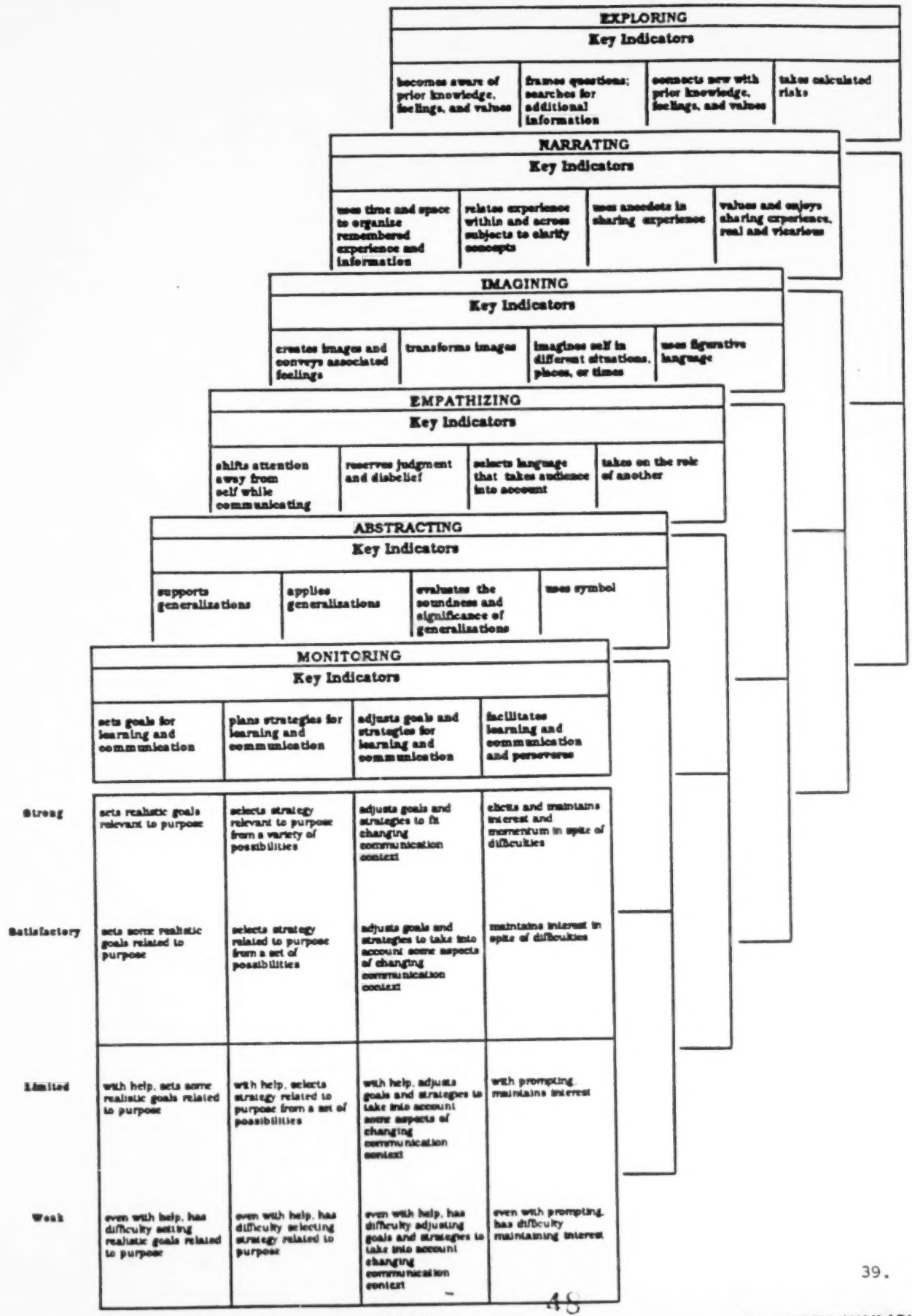
(As one teacher put it, "Good teachers do this already, don't they? By making what we do explicit in this way, you're helping us understand what we do and also helping more teachers become excellent teachers.")

- Will the program be mandatory?

  No, it will be a voluntary program.

- When will it be available?

  In the fall of 1991, from the Learning Resources Distributing Centre in Edmonton.


EXPLORING
Key Indicators
becomes aware of prior knowledge, feelings, and values
frames questions; searches for additional information
connects new with prior knowledge, feelings, and values
takes calculated risks
NARRATING
Key Indicators
uses time and space to organize remembered experience and information
relates experience within and across subjects to clarify concepts
uses anecdote in sharing experience
values and enjoys sharing experience, real and vicarious
IMAGINING
Key Indicators
creates images and conveys associated feelings
transforms images
imagines self in different situations, places, or times
uses figurative language
EMPATHIZING
Key Indicators
shifts attention away from self while communicating
reserves judgment and disbelief
selects language that takes audience into account
takes on the role of another
ABSTRACTING
Key Indicators
supports generalizations
applies generalizations
evaluates the soundness and significance of generalizations
uses symbol
MONITORING
Key Indicators
sets goals for learning and communication
plans strategies for learning and communication
adjusts goals and strategies for learning and communication
facilitates learning and communication and perseverse
Strong
sets realistic goals relevant to purpose
selects strategy relevant to purpose from a variety of possibilities
adjusts goals and strategies to fit changing communication context
elicits and maintains interest and momentum in spite of difficulties
Satisfactory
sets some realistic goals related to purpose
selects strategy related to purpose from a set of possibilities
adjusts goals and strategies to take into account some aspects of changing communication context
maintains interest in spite of difficulties
Limited
with help, sets some realistic goals related to purpose
with help, selects strategy related to purpose from a set of possibilities
with help, adjusts goals and strategies to take into account some aspects of changing communication context
with prompting, maintains interest
Weak
even with help, has difficulty setting realistic goals related to purpose
even with help, has difficulty selecting strategy related to purpose
even with help, has difficulty adjusting goals and strategies to take into account changing communication context
even with prompting, has difficulty maintaining interest

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